

PROCEEDINGS  
OF THE  
CALIFORNIA ACADEMY OF SCIENCES

Fourth Series

Vol. XXV, No. 6, pp. 189-214, pls. 20-22

June 1, 1944

ALICE EASTWOOD  
SEMI-CENTENNIAL PUBLICATIONS

No. 6

THE GENUS *DRYMARIA* IN, AND ADJACENT TO,  
THE SONORAN DESERT

BY

IRA L. WIGGINS

*Professor of Biology (Botany), Stanford University*



THE TAXONOMIST frequently finds that it is necessary to study not only those representatives of a genus that occur within a circumscribed area in which he is interested, but numerous other species from contiguous regions as well. This necessity became apparent at once when I attempted to construct a key to the species of *Drymaria* known to occur within the limits of the Sonoran Desert, for the relationships of several of the desert species were obviously with forms growing in the mountains nearby, or in the drier parts of New Mexico, Texas, and northern Mexico. As these close relatives were studied, still others had to be taken into account until eighteen entities entered into the problem. Of this number, only four or five actually grow within the desert, but it seemed desirable to present the total results of the study rather than to restrict the paper to a treatment of those species which occur regularly in the desert.

Willdenow recognized four species, three of them new, when he set up the genus *Drymaria* in 1819 (in R. and S. Syst. Veg. 5: 406, 1819), and based the new genus on *Holosteum cordatum* Linn. Five years later DeCandolle (Prodr. 1: 395, 1924) listed five species, the fifth having been described by Humboldt, Bonpland, and Kunth in 1823 (Nov. Gen. et Sp. 6: 17-21, pl. 515-516, 1823). Since that time there has been a steady increase in the number of species recognized in the genus. At present, one hundred nine specific and varietal names have been applied in *Drymaria*. It is probable that a thorough investigation of the genus would require reduction of certain combinations and the description of other forms not as yet recognized.

Most of the species and varieties of *Drymaria* occur in Mexico and the west-

ern part of South America. Sixty-four, exclusive of the new entities proposed here, have been described from North America, about thirty from South America, several from the West Indies and Central America, one species is nearly cosmopolitan in the tropics, and one occurs in Australia. Over fifty species have been recorded from Mexico.

The genus includes both annual and perennial herbs, the latter sometimes slightly suffrutescent at the base. Most species are clearly annual or perennial, with little or no tendency for the annuals to persist beyond a single growing season. But occasionally a plant of an annual species may, under particularly favorable conditions, become a biennial or short-lived perennial.

The species vary in habit from prostrate, through procumbent and ascending, to strictly erect plants. The stems may be simple, unbranched, or profusely branched from either the base or in the upper part of the plant. The stems and branches are slender, often nearly filiform in such species as *D. tenella*, *D. debilis*, and *D. carinata*. The internodes may be rather short, as in *D. crassifolia*, with the leaves exceeding the internodes and forming dense mats, or they may be greatly elongated and much surpassing the leaves, as in the closely related *D. holostcoides*. The herbage is pubescent in some species, glabrous or glabrate in others. The pubescence may be glandular or non-glandular in different species.

The leaves are useful in separating the genus into two main groups, one of which possesses leaves that are ovate, cordate, or broadly elliptic and from half as wide as long to distinctly broader than long. The other group has leaves that are linear, filiform, or narrowly oblong or subulate. These leaves show little tendency toward an elliptic outline and are always several times as long as broad. A few species have fleshy or leathery leaves, but most of them have thin, herbaceous leaves of delicate texture.

The arrangement of the flowers in the inflorescence is racemose or cymose. The former arrangement is found in *D. holostcoides*, *C. crassifolia*, and *D. pachyphylla*. In these species the flowers appear to be in dense clusters in the axils of most leaves and at or near the apices of the branches. Examination of this arrangement reveals that the flowers are borne in a short raceme, each flower subtended by a small, scarious bract. The minute bracts nearly conceal the rachis. Such racemes are axillary to the larger leaves of the fascicles formed at each node. In other species studied the inflorescence is cymose. A schematic representation of this type of inflorescence as exhibited by most of the annual species of *Drymaria* is shown in Pl. 20, fig. 1, and a diagram of the inflorescence of *D. sperguloides* is shown in fig. 2. In the latter figure, the small, solidly inked circles represent abortive flowers.

Floral characters useful in differentiating species of *Drymaria* include the shape, length, comparative length and width, venation, and texture of the sepals; the shape, depth of the lobing, length as compared with the length of other floral structures, and the presence or absence of appendages between the main lobes of the petals; and the comparative length of claw and blade

of the petals. Flowers of comparable age must be selected in making these comparisons, however, for the petals are persistent and the mature capsules are usually much longer than the ovary at anthesis.

The aestivation of the sepals is, in all cases examined, cochlear, a modification of the imbricate pattern. In this type of sepal arrangement one sepal is wholly outside the others, one has both margins overlapped by adjacent sepals, and of the other three each has one margin overlapped by an adjacent sepal and the other margin overlapping that of its neighbor. The outermost, exposed sepal is on the abaxial side of the calyx, while the one with both margins covered is on or near the adaxial side. The margins that are covered by the edges of adjacent sepals are almost always more broadly scarious-winged than the exposed margins (Pl. 20, fig. 3). This does not hold in the case of *D. carinata* and its variety, for in these plants the thicker, herbaceous part of the sepals is reduced to a narrow midrib and the sepals are nearly or quite symmetrical.

All species studied have stamens that are slightly dilated at the base to form a shallow, connate cup.

It is doubtful that there is any value in trying to differentiate between species with "stipitate" and "sessile" ovaries, for all species examined had the ovaries elevated to some degree on a slender, short stipe. Though short, this stipe was distinctly demonstrable in every case.

The seeds are so small that definitive measurements are difficult to make. Differences in the depth of the notch adjacent to the hilum, the sculpturing of the surface, the over-all pattern of the surface markings, and sometimes the color of the seeds can be used to advantage. The seeds of *D. viscosa* are striking in that they are smooth and pale cream or pale buff instead of tessellated, muriculate, or tuberculate and dark colored as the seeds of most other species are.

During the course of this study the material of *Drymaria* at the California Academy of Sciences, in the herbarium of the University of California, and in the Dudley Herbarium at Stanford University has been available constantly. The types of a number of species were studied, notes taken, and photographs of them made during a visit to the herbarium of the Royal Botanic Garden at Kew, Surrey, and to the Gray Herbarium of Harvard University in 1937. These notes and photographs were valuable aids in determining specific limits. The type specimens of Brandegees species, deposited in the herbarium of the University of California, and an isotype of *D. depressa* Greene, in the herbarium of the California Academy of Sciences, clarified the status of several poorly known species. My sincere thanks are due, and gladly given, to Miss Alice Eastwood for permitting me to borrow material from the herbarium of the California Academy of Sciences. Appreciation is hereby expressed, also, to Dr. Herbert L. Mason, of the University of California; to Mr. A. D. Cotton, Keeper of the Herbarium of the Royal Botanic Garden, Kew, England; and to Dr. M. L. Fernald, of the Gray Herbarium at Harvard

University, for the privilege of studying material and types deposited in the herbaria under their supervision.

In citing specimens, the herbaria in which the specimens are deposited are indicated by the following abbreviations:

California Academy of Sciences . . . . .	CA
Dudley Herbarium, Stanford University . . . . .	D
Gray Herbarium, Harvard University . . . . .	G
Royal Botanic Garden, Kew, England . . . . .	K
University of California at Berkeley . . . . .	UC

#### TAXONOMIC TREATMENT

### **Drymaria** Willd. in R. and S.

Syst. Veg. 5:406, 1819.

Annual or perennial plants with slender, prostrate, decumbent, ascending, erect or scrambling stems. Branches simple or profusely branched, sparsely to densely foliate. Leaves linear, subulate, elliptic, ovate, or cordate, thin and herbaceous or thick and fleshy or leathery, glabrous or pubescent, glandular or eglandular; stipules usually present, subulate or linear, persistent or fugacious. Flowers small, in cymes or racemes, sessile or pedicellate; sepals 5, 1-3-nerved, similar or slightly dissimilar, the middle portion herbaceous and often puberulent or glandular, one or both of the margins scarious-winged; petals (in ours) deeply cleft, in some species bearing additional narrow appendages near base of the cleft; stamens 5, the filaments slightly dilated and connate at the base; anthers ovate, much shorter than the filaments. Style slender, from much shorter than, to about equal to, the ovary; stigma 3-lobed or 3-cleft, the lobes shorter or longer than the style. Capsule ovoid to subglobose, longitudinally dehiscent, mostly 3-valved, 1-celled. Seeds obovoid to obovoid-reniform, variously sculptured, most dark brown, dull or slightly shining.

Type species.—*Holosticum cordatum* Linn.

#### KEY TO THE SPECIES

Leaves about as broad as, or broader than long.

Flowers in short, crowded, umbel-like racemes; leaves leathery or fleshy, often glaucous; plants mostly prostrate or decumbent.

Stamens equaling or surpassing the ovary at anthesis; style one-fourth as long as, or equaling, the ovary; petals with 4-6 appendages near base of inner margins of main lobes.

Herbage somewhat puberulent, scarcely glaucous; petals 3-3.5 mm. long, about equaling the sepals; style 1.4-1.6 mm. long; internodes exceeding the leaves.....1. *D. holosteoides*.

Herbage glabrous, conspicuously glaucous; petals 2-2.2 mm. long, shorter than the sepals; style 0.6-0.8 mm. long; internodes mostly shorter than the leaves.....2. *D. crassifolia*.

Stamens about half as long as the ovary at anthesis; style less than one-fifth as long as the ovary; petals with only one appendage at base of each main lobe .....3. *D. pachyphylla*.



Flowers in cymes; leaves thin, not fleshy nor leathery, rarely glaucous; plants mainly erect or ascending.

Sepals strongly carinate, the herbaceous mid-portion narrowly linear.

Claws of petals half as long as, and gradually widening to, the blade; petals slightly exceeding the sepals; plant annual. . . . . 4. *D. carinata*.

Claws of petals very short, less than one-sixth as long as, and flaring abruptly to, the limb; petals often twice as long as the sepals; plants perennial. . . . . 4a. *D. carinata* var. *perennis*.

Sepals not carinate, subequal, the herbaceous mid-portion elliptic.

Petals surpassing the sepals; sepals not strongly ribbed.

Sepals oblong-elliptic or narrowly oblanceolate, obtuse at the apex; petals 5-6.5 mm. long; pubescence of short hairs 0.4 mm. long or less.

Plants perennial; leaves shallowly cordate; sepals glabrous or sparingly hairy near base. . . . . 5. *D. polystachya*.

Plants annual; leaves truncate or broadly cuneate at the base; sepals copiously glandular-puberulent on lower two-thirds.

5a. *D. polystachya* var. *diffusa*.

Sepals broadly ovate, acute at the apex; petals 3.8-4.5 mm. long; pubescence of crinkled, spreading hairs to 1 mm. long. . . . 6. *D. debilis*.

Petals shorter than the sepals; sepals strongly 3-ribbed. . . . . 7. *D. Fendleri*.

Leaves linear or narrowly oblong, several times as long as broad.

Herbage heavily viscid-puberulent throughout; seeds smooth, not tessellate nor muriculate. . . . . 8. *D. viscosa*.

Herbage viscid-puberulent only on pedicels and sepals, or glabrous; seeds tessellate, muriculate, or otherwise roughened.

Petals fimbriate-appendaged.

Herbaceous part of sepals obtuse, glabrous; stigmas subsessile; petals with 1 lobe at base of each main lobe; leaves pseudo-vericillate.

9. *D. sperguloides*.

Herbaceous part of sepals acute, glandular-puberulent; stigmas not subsessile; petals with 2-4 appendages at base of each main lobe; leaves not pseudo-vericillate.

Petals 6 mm. long, much exceeding the sepals; appendages long, slender, nearly equaling the main lobes; leaves narrowly elliptic.

10. *D. arenarioides*.

Petals 4 mm. long, barely exceeding the sepals; appendages oblong, half to two-thirds as long as the main lobes; leaves narrowly linear.

11. *D. peninsularis*.

Petals merely bifid, without appendages along inner margins of main lobes.

Petals slightly exceeding the sepals; plants puberulent.

Herbaceous part of sepals obtuse; leaves mostly 5 mm. long or less; claws of petals narrow, naked. . . . . 12. *D. Johnstonii*

Herbaceous part of sepals acute; leaves mostly over 10 mm. long; claws of petals broadly winged, as wide as the limb. . . . 13. *D. effusa*.

Petals shorter than the sepals; plants glabrous, or base of sepals and upper parts of internodes sparsely puberulent.

Stems erect, branching above; leaves narrowly linear, 1 mm. wide or less; seeds minutely but sharply muriculate.

Sepals acute; herbage glabrous. . . . . 14. *D. tenella*.

Sepals acuminate; upper parts of internodes and bases of sepals puberulent. . . . . 14a. *D. tenella* var. *nodosa*.

Stems decumbent or spreading, branched from the base, leaves oblong, to 3 mm. wide; seeds tessellate with low, rounded bosses.

15. *D. depressa*.

1. *Drymaria holosteoides* Benth. Bot. Voy. Sulph. 16, 1844

(Plate 20, figs. 4-12)

*Drymaria Veatchii* CURRAN, Proc. Calif. Acad. Sci. (II), 1:227, 1888.*Mollugophytum holostoides*. M. E. JONES, Extract from Contr. West. Bot. 18:35, 1933.

Annual, with slender, spreading, decumbent or prostrate stems 4-40 cm. long, some of them often stolon-like and forming secondary rosettes at rooted nodes, internodes 2-10 cm. long, mostly conspicuously exceeding the leaves, spreadingly puberulent and somewhat glandular, older stems glabrate; stipules lacking or represented by narrow scarious wing between bases of a leaf-pair; leaves mostly in fascicles of 4-6 at each node, blades spatulate-elliptic, 3-7 mm. wide, 4-12 mm. long, somewhat fleshy or leathery, faintly 3-nerved beneath, glabrous or sparsely puberulent near the base, lightly glaucous, on slender petioles 2-10 mm. long; flowers in dense, short racemes in axils of most leaves, each flower subtended by a narrow, ovate, hyaline bract about 1 mm. long; pedicels slender, 3-9 mm. long, glandular-puberulent; sepals obovate, obtuse or rounded at the apex, 3-3.5 mm. long, the middle portion herbaceous, glandular-puberulent at the base, glabrous and faintly glaucous above, the scarious margins conspicuous; petals persistent, about equaling the sepals, 2.8-3.2 mm. long, white, bifid about half way to the base and bearing 2-4 narrow segments near the base of inner margin of each main lobe, the claw short, broad, somewhat erosulate; stamens about equaling the petals, nearly twice as long as the ovary; filaments slightly dilated at the base; ovary about 1.5 mm. high; style equaling the ovary; capsule broadly ovoid, 1.5-2 mm. high; seeds obovoid-reniform, 0.6-0.8 mm. long, dark brown to black, dull, minutely rounded-tuberculate in longitudinal lines.

*Type locality*:—"Cape San Lucas," Baja California, Mexico.

*Distribution*:—Sandy areas from the vicinity of Calmalli to La Paz, and possibly to Cape San Lucas; Cedros Island; Magdalena Island; Tiburon Island, Mexico.

*Specimens examined*:—Magdalena Bay, *Hinds*, 1841, (K, type. This is the only specimen of *D. holosteoides* in the Kew Herbarium collected on the Voyage of the "Sulphur," and in spite of the statement in Benthams publication to the effect that the plant was obtained at "Cape San Lucas" the type locality is probably Magdalena Bay, on Magdalena Island). Magdalena Bay, *Brandegee*, March 1889, (UC); *Bryant*, 1888, (UC, type of *D. Veatchii*); hills east of Calmalli, *Purpus 151*, (D, UC); rocky hillside 4 miles east of San Ignacio, *Wiggins 7898*, (D, UC); 2 miles west of San Ignacio, *Reed 6156*, (D); Coyote Bay, Concepción Bay, *Johnston 4178*, (CA); *Gentry 4059*, (D); Concepción Bay, *Shreve 7095*, (D); 5 miles south of head of Concepción Bay, *Wiggins 5456*, (CA, D, UC); Mulége, *Johnston 3690*, (CA); San Luis Gonzales Bay, *Johnston 3329*, (CA); San Francisco Island, *Johnston 2949*, (CA); dry washes between Medano and Venancio, *Wiggins 5531*, (D, UC); La Paz, *Johnston 3048*, (CA, UC); *Brandegee*, Feb. 2, 1890, (UC); Cedros Island, *Stewart 48-49*, (CA); Willard's Point, Tiburón Island, Sonora, *Johnston 4263*, (CA, D, UC).

A long-standing confusion concerning the identity of this species and the closely related *D. crassifolia* was cleared up by Brandegee (*Zoe* 2: 66-70. 1891).

The petals in *D. holosteoides* are more pronouncedly fimbriate at the base of the sinus than they are in *D. crassifolia*, and the style is nearly or quite as long as the ovary in *holosteoides*, but only half as long in *D. crassifolia*. The densely matted habit of *crassifolia* is the most readily observed character for separating the two species.

## 2. *Drymaria crassifolia* Benth. Bot. Voy. Sulph. 16, 1844

(Plate 20, figs. 20-26)

*Mollugophytum crassifolium* M. E. JONES, Extract from Contr. West. Bot. 18:35. 1933.

Prostrate, matted, glabrous and glaucous perennial; stems profusely branched, 3-20 cm. long, internodes 0.5-2.5 cm. long, mostly obscured by the numerous, fasciculate leaves; stipules as in *D. holosteoides*; petioles slender, 3-9 mm. long; leaf-blades broadly ovate, broadly rhombic-spatulate, or elliptic, mostly rounded at the apex and broadly cuneate at the base, 2.5-8 mm. broad, 4-12 mm. long, fleshy, glaucous, indistinctly 3-nerved beneath; flowers numerous in short cluster-like racemes, pedicels 5-12 mm. long; sepals slightly dissimilar, broadly elliptic, rounded, acutish, or faintly emarginate at the tip, 1.4-1.8 mm. wide, 3-3.4 mm. long, fleshy, glaucous, faintly veined; petals 2-3 mm. long, bifid about to middle, usually with 2 short, rounded or truncate appendages at base of inner margin of each main lobe; stamens 1.8-2 mm. long, about equaling the ovary; style 0.4-0.6 mm. long, about one-fourth as long as the ovary, the stigma-lobes minute; capsule ovoid, about equaling the sepals; seeds about 0.8 mm. long, obovoid-reniform, minutely reticulate in longitudinal lines, black, dull.

*Type locality*:—Cape San Lucas, Baja California, Mexico.

*Distribution*:—Sandy soil and along washes, Cape Region, Baja California.

*Specimens examined*:—Cape San Lucas, *Hinds*, 1841, (K, type); Cabo San Lucas, *Shreve* 7258, (D); on beach sands, between the town of Cabo San Lucas and the end of the peninsula, *Whitehead* 906, (D); seashore, Todos Santos, *M. E. Jones* 27046, (D, UC); San José del Cabo, *Purpus* 265, (UC); *Anthony*, Mar.-June, 1897, (UC); *Brandegge*, Oct. 7, 1890, and Nov., 1902, (UC).

In commenting on *D. holosteoides*, Johnston wrote (Proc. Calif. Acad. Sci. IV. 12: 1024. 1924), "*Drymaria crassifolia* . . . is a very closely related form known only from San José del Cabo, and with little more than its perennial habit to distinguish it." It seems to me that the heavily glaucous herbage, the shorter stamens, the shorter petals with less strongly fimbriate appendages, the shorter internodes and matted habit, are characters of sufficient magnitude to warrant retaining *D. crassifolia* as a distinct species. Further field work may bring to light additional localities in which it grows.

## 3. *Drymaria pachyphylla* Wootton and Standley, Contr. U. S.

Nat. Herb. 16:121, 1913

(Plate 20, figs. 13-19)

Annual, with slender, spreading, prostrate stems 3-15 cm. long, the internodes 2-12 cm. long, much surpassing the leaves, which often are confined to terminal tufts; leaves mostly pseudovericillate in 4's, the bases of each

pair connate in a narrow, scarious membrane; petioles slender, 5–7 mm. long, blades broadly elliptic, rhombic-ovate, or broadly ovate, 3–11 mm. wide, 5–14 mm. long, somewhat fleshy, green or faintly glaucous, indistinctly 3-nerved; flowers in small, racemose clusters, about 3–15 flowers on each short rachis, each subtended by a narrowly ovate, hyaline bract 1.5–2 mm. long; pedicels 1–4 mm. long; sepals broadly ovate, 1.5–2 mm. wide, 2.5–3 mm. long, rounded at the apex, green and herbaceous, with membranous, white margins about 0.2 mm. wide; petals about equaling or slightly shorter than the sepals, bifid one-third of way to base, each lobe bearing a broad, blunt appendage half as long as itself near the base of the inner margin; stamens 1–1.2 mm. long, half as long as the ovary; style 0.2 mm. long, the stigmas scarcely longer; capsule broadly ovoid to subglobose, about equaling the sepals, yellowish to pale brown; seeds 0.6–0.8 mm. long, minutely granular-tessellate, dark brown, dull.

*Type locality*:—On the plains south of the White Sands, Doña Ana County, New Mexico.

*Distribution*:—Sandy soil, southeastern Arizona, through New Mexico to western Texas and in adjacent Mexico.

*Specimens examined*:—Arizona: Chiricahua Mts., *M. E. Jones*, Sept. 22, 1931, (D, UC). New Mexico: plains south of the White Sands, Doña Ana Co., *Wootton 405*, (D, UC, isotypes). Mexico: Torreón, Coahuila, *Purpus 472*, 1903, (UC); Filipinas, Coahuila, *Purpus 4942*, (UC).

This is the species that Sereno Watson (Proc. Am. Acad. 17: 329, 1882) listed from Coahuila as *D. crassifolia*.

#### 4. *Drymaria carinata* Brandegees, Zoe 2:70, 1891

(Plate 20, figs. 27–31)

Annual, with erect or ascending, weak, slender stems and glabrous herbage (sparsely puberulent in the variety); stipules narrowly subulate, 2–4 mm. long, white, subpersistent; leaves broadly ovate, the blades 14–16 mm. long, 5–18 mm. wide, apiculate, from broadly cuneate to shallowly cordate at the base, thin, finely but distinctly 3-veined, bright green above, slightly paler beneath; petioles half as long as the blades to equaling them; inflorescence loosely cymose; peduncles and pedicels filiform; pedicels 2–8 mm. long, each subtended by an ovate, acute, scarious bract 1–1.5 mm. long; sepals broadly ovate-lanceolate, strongly incurved, bluntly carinate, 2–2.5 mm. long, the green midvein narrow; petals 1.5–2.5 mm. long, bifid two-thirds of way to base, the lobes lanceolate to narrowly spatulate, entire or faintly emarginate, devoid of marginal appendages; the claw narrow; stamens about equaling or slightly exceeding the sepals, filaments linear; ovary 1–1.2 mm. high, short-stipitate; capsule subglobose, about equaling the sepals; seeds obovate-reniform, 0.4–0.6 mm. long, deep amber to light brown, minutely tessellate.

*Type locality*:—Sierra de la Laguna, Baja California, Mexico.

*Distribution*:—Mountains of southern Baja California.



*Specimens examined*:—Sierra de la Laguna, *Brandeggee 34*, Jan. 21, 1890, (UC, type); Laguna Mts., *M. E. Jones 24193*, (CA); Sierra de la Trinidad, *Brandeggee*, Nov. 1902, (UC); Miraflores, *Brandeggee*, Oct. 14, 1890, (UC); El Taste, *Brandeggee*, Sept. 14, 1893, (UC); San Felipe, *Purpus 488*, 1901, (UC); under overhanging rocks, sides and bottoms of wash 22 miles south of La Paz, *Wiggins 5610*, (D).

4a. *Drymaria carinata* Brand. var. *perennis*, Wiggins, var. nov.

(Plate 20, figs. 32–34)

Ab *D. carinata* typica radicibus perennibus, caulibus basim lignosis, nodis sparse minutissimeque scaberulosis, lobis petalorum latis curtisque differt.

*Type specimen*, deposited in the Dudley Herbarium, Stanford University, no. 263280, was collected in humus on cliff of rocky canyon slope, in oak-pine forest. **La Laguna, Sierra de la Laguna, alt. 6000 feet, Baja California, Mexico, H. S. Gentry 4415**, March 25, 1939.

*Additional specimen examined*.—Sierra de San Francisquito, *Brandeggee*, March 30, 1892, (UC).

There is a clearcut and constant difference between the shape and size of the petals of the variety *perennis* and of those of the typical annual form (Pl. 20, figs. 30, 32–34). The lobes of the former are distinctly broader in comparison with the length, are practically the same width from base to tip, and are more nearly parallel than are those of *D. carinata*. In *perennis*, the claw is shorter and broader, and flares more abruptly to the blade than in the typical material.

5. *Drymaria polystachya* Brandeggee, *Zoe 2*: 70, 1891

(Plate 21, figs. 2–5)

Perennial from a gnarled or tortuous, woody root; stems slender, spreading to ascending, 1–3 dm. long, freely branched, sparingly to moderately pilosulous or glabrate; herbage pubescent and slightly glandular; stipules linear-subulate, 1–2 mm. long; leaf-blades broadly cordate, 6–20 mm. wide, 6–15 mm. long, the apex abruptly short-acuminate or acute, subsessile or on petioles 2–7 mm. long; inflorescence of terminal and subterminal cymes; peduncles slender, 1–8 cm. long, a pair of narrowly ovate, scarious bracts 1.6–2.2 mm. long at each node of the inflorescence; pedicels subfiliform, 0.6–2 cm. long; sepals subequal, oblong-elliptic, 1.5–1.7 mm. wide, 4.5–5.5 mm. long, obtuse or rounded and erosulate at the apex, the broad greenish central portion glabrous or sparingly puberulent, faintly 3-nerved, the margins scarious; petals bifid about to the middle, 5.5–6.5 mm. long, devoid of appendages, the claws narrow, about 2 mm. long, naked; stamens about 3 mm. long; ovary ovoid, nearly equaling the stamens; capsule 3.5–4.5 mm. long; seeds obovoid-reniform, slightly compressed laterally, brown, finely tessellated in numerous longitudinal rows.

*Type locality*:—Cliffs near San José del Cabo, Baja California, Mexico.

*Distribution*:—Among rocks and on cliffs, southern Baja California.

*Specimens examined*:—San José del Cabo, *Brandeggee 35*, Mar. 14, 1890, (UC, type, D).

isotype); *Brandeggee*, March 10, 1892, (UC); *Grabendörfer*, March, 1899, (UC); Sierra de la Trinidad, *Brandeggee*, Nov., 1902, (UC).

Brandeggee described the leaves as "... 1 cm. or less broad,  $\frac{1}{2}$  cm. long, on petioles of nearly the same length." However, most of the leaves are sessile or on petioles only 2–3 mm. long.

The date on the type in the herbarium of the University of California reads "March 14, 1890," and the label bears the number "35." A specimen in the Dudley Herbarium also bears the number "35," but is dated, "March 24, 1890." It is not clear whether the discrepancy in the dates on the two specimens is a clerical error made in copying the labels, or two separate collections are involved. I am inclined toward the former explanation. No mention of the habitat is made on either label, so one must rely solely upon Brandeggee's statement in the original publication for the information that the plant grew on "cliffs" near San José del Cabo.

5a. ***Drymaria polystachya*** Brand. var. ***diffusa*** (Rose) Wiggins, comb. nov.  
(Plate 21, figs. 6–8)

*Drymaria diffusa* ROSE, Contr. U. S. Nat. Herb. 1:130. pl. 12, 1892.

Annual, with weak, spreadingly-ascending stems, glandular-puberulent throughout; leaves with very slender petioles 4–10 mm. long, the blades 3–10 mm. wide, 3–8 mm. long, truncate or broadly cuneate at the base; sepals narrowly oblanceolate, about 3.5 mm. long; petals 4.5–5 mm. long; otherwise as in the typical form of the species.

*Type locality*:—Carmen Island, Baja California, Mexico.

*Distribution*:—Known only from Carmen Island and the mainland of Baja California immediately adjacent.

*Specimens examined*:—Carmen Island, *Palmer 819*, Nov. 1–7, 1890, (UC, 2 isotypes); shady talus slope under basaltic cliffs, above Punta Escondido, Sierra Giganta, alt. 2000 to 3000 feet, *Gentry 3751*, (UC).

6. ***Drymaria debilis*** Brandeggee, Proc. Calif. Acad. Sci. II. 2:131, 1889  
(Plate 21, figs. 9, 10)

Annual; stems subfiliform, weak, spreading-ascending or scandent, 1–2.5 dm. long, sparingly pilosulous, the internodes 3–4.5 cm. long; stipules linear-subulate, somewhat tortuous, 1–1.5 mm. long; petioles slender, 2–10 mm. long, pilosulous; leaf-blades broadly ovate, 3–10 mm. long and wide, acute or abruptly short-acuminate at the apex, abruptly and broadly cuneate or truncate at the base, sparingly pilosulous on both sides or glabrate above; inflorescence loosely cymose; pedicels filiform, 4–14 mm. long, sparsely pubescent; sepals 2.6–3.2 mm. long, pilosulous, ovate-acuminate, or the scarious wings obtusish at the apex, faintly 3-nerved; petals 3.8–4.2 mm. long, bifid about to the middle, the lobes broadly spatulate, the claws narrow and naked; stamens about equaling the sepals, the filaments linear, flattened; capsule ovoid, nearly equaling the sepals; seeds reddish brown, obovoid-reniform, 0.6–0.8 mm. long, minutely tessellate in fine, longitudinal lines.

*Type locality*: Purísima, Baja California, Mexico.

*Distribution*:—Known only from the type locality.

*Specimens examined*:—Purísima, *Brandeggee*, Feb. 13, 1889, (UC, type).

In general appearance *D. debilis* closely resembles *D. carinata*, but differs from that species in having acute, broader sepals that are not at all carinate; more pronouncedly pilosulous herbage, and somewhat shorter petals. The crinkled hairs of the pubescence are often 1–1.2 mm. long, but there are very few glandular hairs mixed with the non-glandular ones. The paucity of glands helps to separate *D. debilis* from *D. polystachya* and its variety, *diffusa*.

## 7. *Drymaria Fendleri* S. Wats. Proc. Am. Acad. 17:328, 1882

(Plate 21, figs. 11–19)

*Drymaria Fendleri* var. *perennis* M. E. JONES, Extract from Contr. West. Bot. 18:65. 1933.

Erect or ascending annual (rarely biennial or perennial under favorable conditions) with glandular-puberulent herbage; stems slender, 1–3.5 dm. long; internodes to 12 cm. long; stipules bifid into linear-subulate lobes 1.5–2 mm. long, persistent; leaves thin, broadly ovate or ovate-cordate, 4–15 mm. long, 6–22 mm. wide, acute or rounded but abruptly apiculate at the apex, truncate or shallowly cordate at the base, on slender petioles 2–7 mm. long, the margins often crinkling on drying; inflorescence cymose; peduncles slender, 1–6 cm. long, usually strongly glandular-puberulent, bearing a pair of ovate, scarious bracts 2–2.5 mm. long at the node; pedicels slender, 1–2 mm. long, or some flowers subsessile in 2–5-flowered clusters; sepals lanceolate, 1–1.4 mm. wide, 4–5 mm. long, strongly 3-ribbed, acute to acuminate, the central portion green, glandular-puberulent, marginal wings scarious; petals 3.5–4 mm. long, bifid about to the middle, the lobes linear-spatulate, claws narrow and naked; stamens half as long as the petals; capsule ovoid, 2–2.5 mm. high, 8–15-seeded; seeds obovoid-reniform, 0.6–0.8 mm. long, reddish brown, minutely tessellated in longitudinal rows.

*Type locality*:—"New Mexico."

*Distribution*:—Foothills and mountains, New Mexico and Arizona to central Mexico, and the Cape Region of Baja California.

*Specimens examined*:—New Mexico: without further locality, *Fendler* 60, 1847, (G, type); *Thurber* 1073, (G); *C. Wright* 866, 1851, (G); La Cuesta, *Bigelow*, 1853, (G); (all of the foregoing specimens are mounted on a single herbarium sheet, and all were cited by Watson in his original description); Silver City, *E. L. Greene*, Sept. 14, 1880, (UC); granite hills, Kingston, Sierra County, *Metcalf* 1378, (CA); under junipers, mountain slope near San José, San Miguel County, *Barneby* 2627, (CA). Arizona: amid big boulders, Prescott, *Eastwood* 16825, (CA); near Prescott, *Kusche*, Sept. 1–5, 1929, (CA). Baja California, Mexico: Cota Ranch, Laguna Mts., 14 miles E. of Todos Santos, *M. E. Jones* 27050, (D, UC, isotypes of var. *perennis* Jones); Saucito, near Sierra San Francisquito, *Brandeggee*, Oct. 14, 1893, (UC); Sierra de la Laguna, *Brandeggee*, Jan. 21, 1890, (UC); Miraflores, *Brandeggee*, Oct. 14, 1890, (UC); Arroyo Hondo, Sierra de la Laguna, *Brandeggee*, Oct. 22, 1893, (UC); San Felipe, *Purpus* 469, Jan.–March, 1901, (UC). Sonora, Mexico: San Bernardo, Rio Mayo, *Gentry* 1338, (UC).

The specimens from Baja California are slightly more robust than those from Arizona and New Mexico, but in qualitative characters the southern and northern specimens are identical. A careful search revealed no morphological characters accompanying the perennial habit of Jones' material, so his variety, *D. Fendleri* var. *perennis* is reduced to synonymy under this species.

8. *Drymaria viscosa* S. Wats. ex Orcutt, West Am. Sci. **2**:57,

1886, nomen nudum. Proc. Am. Acad. **22**:469, 1887

(Plate 21, figs. 20-27)

Annual with prostrate or spreading branches, dichotomously branched stems 5-20 cm. long, and glandular-puberulent leaves, pedicels, and sepals; internodes to 6 cm. long, glabrous or sparsely glandular-puberulent; stipules filiform-subulate, 1-1.5 mm. long, glandular; leaves often pseudo-vericillate, linear to linear-oblongate, 1.5 mm. wide or less, to 15 mm. long, acute or obtuse at the apex, gradually narrowing to a slender petiole 1-3 mm. long; inflorescence cymose; peduncles subfiliform, to 3.5 cm. long; pedicels 1-3 mm. long or some flowers subsessile; sepals narrowly to broadly elliptic, 0.6-1.2 mm. wide, about 2.5 mm. long, the green midrib ending in an excurrent apiculation slightly below the apex of the scarious, glabrous part; petals bifid about two-thirds of the way to the base, 2 mm. long, the linear-spatulate lobes and narrow claw naked; stamens about 1 mm. long, equaling the ovary; style half as long as the ovary; capsule broadly ovoid, nearly equaling the sepals; seeds obovoid-circinate, 0.6 mm. high, pale cream, with light amber angles and dorsal band, smooth or slightly wrinkled, but not tessellate nor muriculate, dull.

*Type locality*.—Socorro, northern Baja California, Mexico. (Misspelled "Socono" in the original publication).

*Distribution*.—In sandy soil from about 30° 20' N. Lat. (vicinity of San Quintín) southward to the Cape Region, Baja California.

*Specimens examined*.—Socorro, *Orcutt 1330*, (G, type, D, UC, isotypes); Lagoon Head, *Palmer 767*, March, 1889, (CA); Magdalena Island, *Orcutt 51*, March, 1917, (CA); *Brandegee*, March 13, 1889, (UC); mainland near Ascension Island, *Anthony*, April 17, 1897, (UC); Calmalli, *Purpus*, Jan.-March, 1898, (UC); along beach on sand dunes, 4 miles south of Guadalupe, *Whitehead 830*, (D); sandy wash 27.4 miles south of Pozo Alemán, *Wiggins 7862*, (D); San Gregorio, *Brandegee*, Feb. 1, 1889, (D).

The light colored, nearly or quite smooth seeds and the heavily viscid herb-  
age of this species are distinctive. In general appearance the plant resembles *Mollugo cerviana* (L.) Seringe.

9. *Drymaria sperguloides* A. Gray, Am. Acad. Arts and Sci.

Mem. II. **4**:11, 1849

(Plate 21, figs. 28-38)

*Mollugophytum sperguloides* M. E. JONES, Extract from Contr. West. Bot. **18**:35, 1933.

Slender, erect, simple or dichotomously branched, glabrous annual 0.5-2 dm. high; leaves in fascicles of 4-6, pseudo-vericillate, linear, 0.5-3 cm. long,



the stipules triangular-subulate, 1–1.5 mm. long, scarious; flowers in terminal and subterminal cymes, on peduncles 0.5–2.5 cm. long; pedicels subfiliform, 1–5 mm. long; sepals dissimilar, narrowly to broadly elliptic, 1–1.5 mm. wide, about 2.5 mm. long, cuculate, 1-nerved, the apex rounded or obtuse, central green portion terminating slightly below the apex of the scarious margins, glabrous; petals 2–2.5 mm. long, bifid about to the middle, 2 linear appendages two-thirds as long as the main lobes arising at the bottom of the sinus, claw winged, nearly as broad as the blade; stamens about 1 mm. long, three-fourths as long as the ovoid ovary; stigma-lobes subsessile; capsule broadly ovoid to subglobose, 3–5 mm. long, exceeding the sepals; seeds obovoid-circinate, not compressed, 1–1.2 mm. long, dark brown, dull, minutely rounded-tuberculate in longitudinal rows.

*Type locality*:—"Valley of Santa Fé Creek in the mountains," New Mexico.

*Distribution*:—Mountain slopes and meadows, Arizona to western Texas and northern Chihuahua.

*Specimens examined*:—New Mexico: without further locality, *Fendler 55*, 1847, (G, type); *C. Wright 867*, (G, UC); Mogollón Mountains, on or near west fork of Gila River, Socorro County, *Metcalfe 349*, (D). Texas: near Presidio del Norte, *Parry*, (G). Arizona: Patagonia Mts., *Kearney and Peebles 10042*, (UC); near San Francisco Mts., *Fulton 7368*, (CA); Eastview, Rincon Mts., *Blumer 3583*, (D); Barfoot Park, Chiricahua Mts., *Blumer 1433*, (D). Chihuahua, Mexico: hills and mesas near Guerrero, *Pringle 1192*, (D).

The label on the type sheet bears no locality other than "Novo-Mexicanae," but the inscription "*Drymaria sperguloides* n. sp." is in the handwriting of Asa Gray, and it is assumed that the more detailed locality data were obtained by him from Fendler's notes or through correspondence.

The large capsules and seeds are distinguishing characters. The pseudo-verticillate arrangement of the leaves is sufficient, even in young plants, to separate it from *D. tenella* and *D. effusa*, both of which have linear leaves and a similar habit.

## 10. *Drymaria arenarioides* Willd. in Roem. and Schult. Syst.

Veg. 5: 406, 1819

(Plate 21, fig. 39; Plate 22, figs. 1–8)

*Drymaria frankenioides* H. B. K. Nov. Gen. et Sp. 6: 21. pl. 515, 1823.

Prostrate, glandular-puberulent, canescent, short-lived perennial with profusely branched stems 3–20 cm. long; stipules subulate, 1–1.5 mm. long, persistent, slightly glandular-puberulent; leaves more or less fasciculate, linear-lanceolate to narrowly elliptic, 1–2.5 mm. wide, 5–15 mm. long, granular-puberulent and slightly canescent, acute, tapering gradually to a short, slender petiole 1–2 mm. long; flowers axillary and in terminal, 1–3-flowered cymes; pedicels slender, 3–10 mm. long, often deflexed in fruit; sepals dissimilar, narrowly lanceolate to ovate-lanceolate, 1–2.2 mm. wide, 5–6 mm. long, acute to short-acuminate, weakly 1-nerved, the margins scarious; petals 5–6.5 mm. long, divided into 6 lobes about to the middle, the main, outer ones

1–1.2 mm. wide, the inner 4 in 2 pairs of filiform appendages slightly shorter than the main lobes; stamens about 1.5 mm. long, equaling the ovary; style half as long as the ovary; capsule ovoid, 4–5 mm. long; seeds orbicular-circinate, slightly compressed laterally, with a pronounced, broad, dorsal groove and deep lateral depressions, uniformly and minutely granular-tessellate, dull, brown.

*Type locality*.—Pachuca, Mexico.

*Distribution*.—Northern Sonora and Chihuahua and southward into central Mexico.

*Specimens examined*.—Chihuahua: hills and plains near Chihuahua (City), *Pringle 715*, (UC); Chihuahua, *Purpus 1123*, (UC). Sonora: gravelly slopes 20 miles south of Llano, *Wiggins 7235*, (D); *Shreve 7322*, (D); southern edge of oak belt 35 km. south of Nogales, *Ferris 8810*, (D); rocky benches, Nogales road, about 1 mile north of Cumetál, *Abrams 13178*, (D). Hidalgo: Ixmiquilpan, *Purpus 483*, Feb., 1905, (UC). Zacatecas: *Purpus 133*, 1903, (UC).

The filiform central lobes of the petals are surprisingly uniform in length, width, and point of insertion. There is a visible vascular strand, similar to those running to the main lobes, leading to each pair of the appendages. These bundles depart from the main petal bundle just below the sinus.

The seeds are distinctive in that the tessellations are not arranged in rows, but form a low, close mosaic over the whole surface. The broad, dorsally grooved back, and the tight coil of the embryo are noteworthy also.

11. ***Drymaria peninsularis*** Blake, Journ. Wash. Acad. Sci. **14**:285, 1924  
(Plate 22, figs. 9–16)

Prostrate, decumbent, or ascending annual, or sometimes persisting as a perennial, with many freely branched stems 0.5–2 dm. long; herbage pale green or slightly glaucescent, glandular-hirtellous throughout; internodes 2–25 mm. long; stipules scarious, undulate, entire, 0.6–0.8 mm. long; leaves linear, somewhat fleshy, sessile, obtuse or rarely acute, lower ones 1–2.5 cm. long, the upper rarely over 4 mm. long, shorter than the internodes; flowers solitary in the axils from about the middle of the stems to the apex; pedicels 2–12 mm. long (in fruit), erect to strongly deflexed; sepals slightly dissimilar, narrowly to broadly ovate-oblong, 1–2 mm. wide, 3.5–4 mm. long at anthesis, 4–4.5 mm. long in fruit, obtuse or rounded, obscurely 1- or 3-nerved, the central part green, herbaceous and glandular-puberulent, the margins scarious, glabrous; petals white, 3.5–4 mm. long, curved, so just equaling the sepals, 4–5-fid nearly to the middle, the outer lobes broader and longer than the central ones, claws slightly dilated and erosulate near the base, nearly as broad as the limb; stamens about two-thirds as long as the sepals, slightly surpassing the ovary; style and stigmatic lobes about equal; capsule ovoid, 3–4 mm. long; seeds round-reniform, plump, 0.7–0.9 mm. long, fuscous, finely and bluntly tessellate, the bosses near the base of the dorsal surface in longitudinal rows, not aligned elsewhere.

*Type locality*:—Cape Region, Baja California, Mexico.

*Distribution*:—Known only from the Cape Region of Baja California, Mexico.

*Specimens examined*: Cape Region, *Purpus* 423, (UC, isotype); Cabo San Lucas, *Brandeggee* 30, March 17, 1892, (D, UC); *Brandeggee*, Nov., 1902, (UC); Canyon Salado, *Purpus* 337, (UC); coast south of Pescadero, *Brandeggee*, Nov., 1902, (UC); Arroyo Salado (San José del Cabo), *Purpus* 496, (UC); El Taste, *Brandeggee*, Sept. 11, 1893, (UC); Cabo San Lucas, *Johansen* 541, (D).

The leaves are narrower and the upper ones more reduced in *D. peninsularis* than they are in *D. arcuarioides*, with which the former was long identified. The sepals of *D. arcuarioides* are more acute than they are in *D. peninsularis*, and the appendages in the sinuses of the petals are longer and narrower in the former species than they are in the latter. The seeds of the two species are quite similar.

## 12. *Drymaria Johnstonii* Wiggins, sp. nov.

(Plate 22, figs. 17–21, 36)

Planta annua gracilis, ramulis decumbentibus vel ascendentibus glaucis 5–10 cm. longis glanduloso-puberulentibus; stipulae subulatae 0.5–0.8 mm. longae; folia opposita vel fasciculata linearia subcarnosa 2–5 mm. longa sessilia apicem obtusa vel rotundata; flores axillarii solitarii, sepalis 2.2–2.5 mm. longis ellipticis obtusis, margine membraneis, petalis semibifidis 2.5–3 mm. longis albis nudis sepala vix superantibus; staminibus ovarium vix superantibus; ovarium 1 mm. altum; capsula anguste ovata 2.5–3 mm. longa sepala vix superantia; semina 2–5 nigra obovata minute granulo-muriculata 0.6 mm. longa.

Annual, with freely branching, slender, decumbent or spreadingly ascending stems 1–1.5 dm. long and slightly fleshy, glaucescent leaves, puberulent throughout with stout, short-stipitate, whitish glandular and simple hairs; internodes 5–14 mm. long; stipules subulate, scarious, 0.5–0.8 mm. long, persistent; leaves opposite or the lower ones sometimes fasciculate, linear, slightly fleshy, 2–5 mm. long, or basal ones up to 1 cm. long, faintly 1-nerved, sessile, rounded or obtuse at the apex; flowers axillary, solitary; pedicels slender, 1–2 mm. long at anthesis, 4–8 mm. long in fruit; sepals herbaceous-fleshy, 2.2–2.5 mm. long, elliptic, obtuse at the apex, the scarious, hyaline margins evident on the inner sepals and the covered edges of the outer sepals; petals white, bifid nearly to the middle, devoid of appendages, 2.5–3 mm. long, slightly surpassing the sepals; stamens equaling or slightly surpassing the ovary; style 0.2 mm. long or less, much exceeded by the stigma-lobes; capsule narrowly ovoid, acute, 2.5–3 mm. long, equaling the sepals or slightly exceeding them, 2–5-seeded; seeds black, 0.6 mm. long, obovoid-reniform, minutely and uniformly granular-muriculate, dull.

*Type* in the herbarium of the California Academy of Sciences no. 82814, collected in crevices of rock on mesa near crest of island, the isthmus, **Espíritu Santo Island, Baja California, Mexico**, *Ivan M. Johnston* 3972, May 31, 1921.

Only one plant was seen and the species has not been re-collected. Johnston (Proc. Calif. Acad. Sci. [IV], **12**:1023, 1924) determined it, tentatively, as *D. arenarioides* and stated that the plant seemed undescribed. He also said that the plant on the mainland of Baja California which had been called *D. arenarioides* was different, both from his Espíritu Island plant and the material called *D. arenarioides* from eastern Mexico. Subsequently S. F. Blake described the peninsula plant as *D. peninsularis*, but he did not have access to this material of Johnston's.

*D. Johnstonii* closely resembles a depauperate plant of *D. peninsularis*, but differs from that species in having few leaves over 4–5 mm. long, petals entirely devoid of appendages, and in having seeds that are less tightly circinate, ungrooved dorsally, and in being much more finely muriculate over the whole surface.

### 13. *Drymaria effusa* A. Gray, Pl. Wright. **2**:19, 1853

Slender annual 0.8–2 dm. high, dichotomously branched above the second or third nodes, minutely puberulent, or the internodes becoming glabrate; internodes 2–4 cm. long, or the lowest slightly longer; stipules filiform-subulate, 1.5–2.2 mm. long, entire; basal leaves obovate-spatulate, 1.5–3 mm. wide, 3–10 mm. long, rounded, broadly cuneate at the base, green, sparsely puberulent, on petioles 1–2 mm. long, or subsessile; cauline leaves filiform or narrowly linear, sessile, 1–2.5 cm. long, or the uppermost reduced, faintly 1-nerved, minutely puberulent; flowers solitary in the axils of the upper leaves and of scarious, ovate bracts 0.5–1.5 mm. long; pedicels filiform, 2–4 mm. long; sepals ovate, slightly dissimilar, 1.4–1.8 mm. long, obtuse or rounded at the apex, inconspicuously 1-nerved, minutely but closely puberulent, the winged margins scarious; petals bifid almost to the center, 2–2.8 mm. long, exceeding the sepals, devoid of appendages; claws narrow and naked; stamens about equaling the sepals; ovary 1 mm. high; style 0.4–0.6 mm. long, about equaled by the filiform stigma-lobes; seeds (immature) reddish brown, muriculate.

*Type locality*:—"Mountains east of Santa Cruz, Sonora."

*Distribution*:—Mountains in Santa Cruz, Cochise, and Pima counties, Arizona, and southward into adjacent northern Sonora.

*Specimens examined*:—Sonora: mountains east of Santa Cruz, *C. Wright 869*, Sept., 1851, (G, type). Arizona: Babocomari, Santa Cruz County, *Thurber 995*, (G); Sonoita Valley, *Rothrock 169*, (G); "S. Arizona," *Lemmon 509*, 1881, (G); Huachuca Mountains, *Price*, Aug. 14, 1895, (D).

### \* 14. *Drymaria tenella* A. Gray, Mem. Am. Acad. II. **4**:12, 1849

(Plate 22, figs. 22–27, 34)

Erect, slender annual 0.5–2 dm. high, dichotomously branched above the second or third node, glabrous, or glandular puberulent in the variety; internodes to 3.5 cm. long; basal leaves spatulate-obovate, 1–2.5 mm. long on pedicels of equal length; cauline leaves linear, sessile, 3–15 mm. long, acute, in-



conspicuously 1-nerved, glabrous; stipules white, scarious, linear-subulate, 1 mm. long or less, erect; flowers short-pedicellate or subsessile in the axils or terminal on slender peduncles 5–10 mm. long; sepals ovate-lanceolate, 0.8–1.2 mm. wide, 2.8–3.2 mm. long, acute, strongly 3-ribbed, the margins scarious; petals white, 2.3–2.8 mm. long, bifid to middle or slightly below, the lobes oblong, entire or minutely emarginate, devoid of appendages, claws narrow and naked; stamens slender, about equaling the 1–1.3 mm. high ovary; style 0.2–0.4 mm. long, stigmatic lobes about as long; capsule ovoid, about 2 mm. high, 8–12-seeded; seeds obovoid-reniform, 0.6–0.8 mm. long, minutely but sharply muriculate, reddish brown.

*Type locality*:—Eight miles west of Las Vegas, New Mexico.

*Distribution*:—Mountains of Arizona, New Mexico, and adjacent Chihuahua and Sonora, and in northern Baja California, Mexico.

*Specimens examined*:—New Mexico: eight miles west of Las Vegas, *Fendler 56*, Aug., 1847, (G, type); Pinos Altos Mts., *E. L. Greene 332*, Sept. 8, 1880, (G); Sawyer's Peak, Grant County, *Metcalf 1428*, (CA); without definite locality, *C. Wright 868*, 1851, (G). Arizona: Manning Camp, Rincon Mts., Pima County, *Blumer 3368*, (D); rhyolite spur just N. of Wilgus Ranch, Chiricahua Mts., Cochise County, *Blumer 1639*, (D); Barfoot Park, Chiricahua Mts., *Blumer 1411*, (D). Chihuahua: pine plains, base of the Sierra Madre, *Pringle 1194*, (D). Baja California, Mexico: margins of meadow at La Encantada, Sierra San Pedro Mártir, alt. 2200 m., *Wiggins and Demaree 4915*, (D).

This species is very similar to *D. effusa* in general appearance, but it is separated from that species by the acuminate sepals and the lack of puberulence on the herbage.

14a. *Drymaria tenella* A. Gray, var. *nodosa* (Engelm.), Wiggins, n. comb.  
(Plate 22, figs. 28–33, 37–38)

*Drymaria nodosa* Engelm. apud A. GRAY, Mem. Am. Acad. II. 4:12, 1849.

Upper parts of internodes, peduncles, pedicels and herbaceous portions of the sepals minutely glandular-puberulent; sepals short-acuminate; otherwise as in typical *D. tenella*.

*Type locality*:—Cosiquiriachi, Chihuahua, Mexico.

*Distribution*:—Northern Chihuahua and northeastern Sonora.

*Specimens examined*:—Chihuahua: pine plains, base of the Sierra Madre, *Pringle 1195*, (D); thin soil, rocky hills near Chihuahua, *Pringle 716*, (D). Sonora: Los Pinitos, alt. 6100 ft., *Hartman 138*, (UC).

There are only two minor characters by which the variety can be separated from *D. tenella*, and they are of insufficient value to warrant retaining this entity as a distinct species.

15. *Drymaria depressa* Greene, Leaf. Bot. Obs. and Crit. 1:153, 1905  
(Plate 22, figs. 39–43)

Annual, freely branched plant with slender branches 2–4 cm. long, depressed or spreading, glabrous, the internodes 0.5–2 cm. long; stipules 0.5–1.2 mm. long, whitish, slightly curled; leaves oblanceolate, 1.5–3 mm. wide,

5-13 mm. long, obtuse at the apex, gradually narrowing to the sessile base, glabrous, faintly 3-nerved; inflorescence of compact cymules; pedicels 1.5 mm. long or less, minutely granular-puberulent; sepals oblong, 2.2-2.6 mm. long, rounded at the apex, narrowly scarious-margined, glabrous, distinctly 3-nerved; petals narrow, bifid to the middle, 2-2.2 mm. long, devoid of appendages, the claws narrow, naked; stamens slightly over half as long as the petals, and about equaling the ovary at anthesis; ovary short-stipitate; style nearly as long as the ovary, the stigma-lobes half as long; capsule narrowly ovoid, nearly equaling the sepals at maturity, 8-12-seeded; seeds obovoid-reniform, 0.6-0.8 mm. long, light buff, uniformly and finely tessellate with low, rounded warts, dull.

*Type locality*:—Sawyer's Peak, Grant County, New Mexico.

*Distribution*:—Mountains in eastern Arizona and New Mexico.

*Specimens examined*:—Open glade on Sawyer's Peak, Grant County, New Mexico, alt. 9500 feet, *Metcalf 1430*, (CA, isotype).

Kearney and Peebles suggest that this species may not be distinct from *D. effusa*, but it seems to me that the broader leaves, compact habit, and lack or paucity of puberulence separates it from that species. I have not seen the Arizona material.

## EXPLANATION OF PLATES

PLATE 20

Fig. 1. Diagram of cymose inflorescence common in *Drymaria*.

Fig. 2. Diagram of inflorescence of *D. sperguloides*; solidly inked circles indicate abortive flowers.

Fig. 3. Diagram of aestivation of sepals in *Drymaria*.

Figs. 4-12. *D. holostoides*; figs. 4-8, sepals,  $\times 6.6$ ; fig. 9, petal,  $\times 13$ ; figs. 10-12,  $\times 6.6$ ; fig. 10, ovary and stamens; fig. 11, ovary; fig. 12, petal.

Figs. 13-19. *D. pachyphylla*,  $\times 6.6$ ; fig. 13, petal; fig. 14, ovary and stamens; figs. 15-19, sepals.

Figs. 20-26. *D. crassifolia*,  $\times 6.6$ ; fig. 20, ovary and stamens; fig. 21, petal; figs. 22-26, sepals.

Figs. 27-31. *D. carinata*, figs. 27-29,  $\times 6.6$ ; figs. 30-31,  $\times 13$ ; fig. 27, petal; figs. 28-29, sepals; figs. 30-31, petal and sepal from different plant.

Figs. 32-34. *D. carinata* var. *perennis*,  $\times 13$ ; fig. 32, petal before anthesis; figs. 33-34, petals from different plants at anthesis.



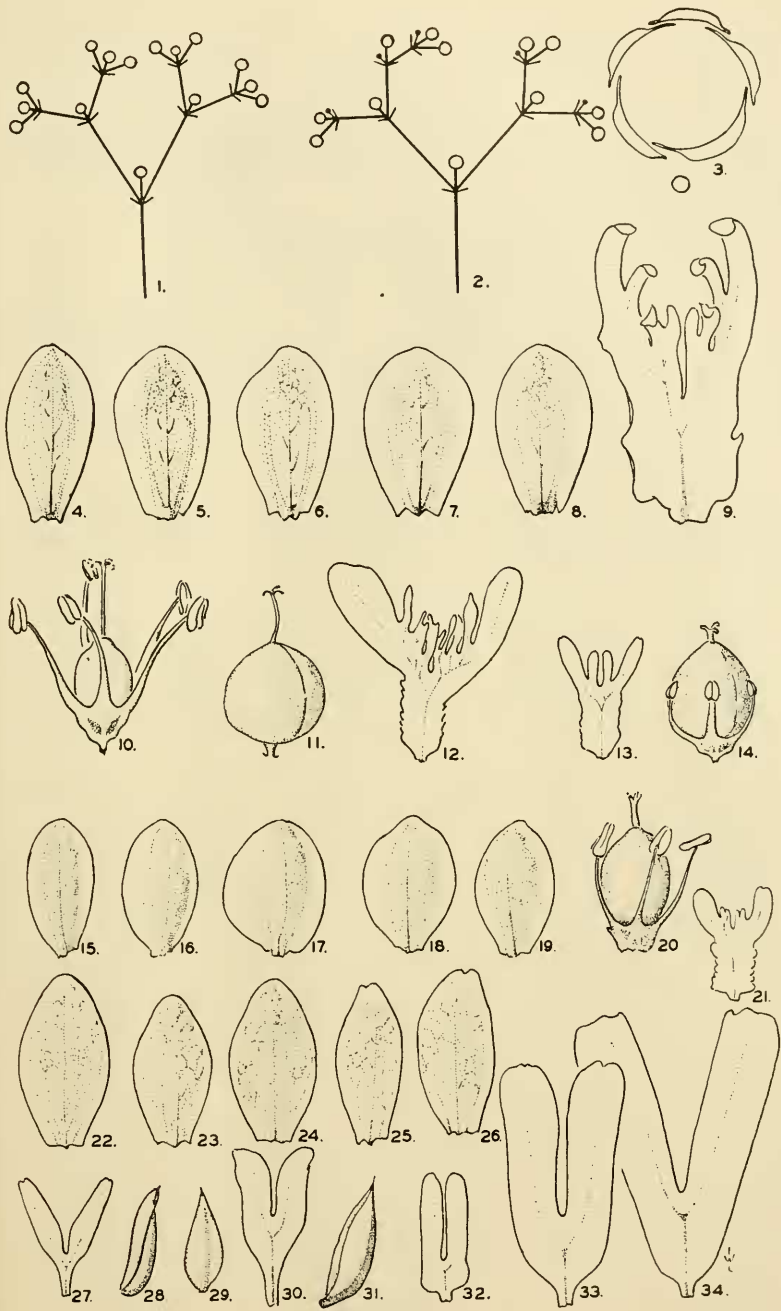


PLATE 21

Fig. 1. *D. crassifolia*,  $\times 6.6$ ; arrangement of leaves at a node, the dotted lines indicate a hyaline "sheath" of epidermal and subepidermal cells overlying the photosynthetic tissue.

Figs. 2-5. *D. polystachya*, petal and sepals,  $\times 6.6$ .

Figs. 6-8. *D. polystachya* var. *diffusa*, sepals and petal,  $\times 6.6$ .

Figs. 9-10. *D. debilis*, petal and sepal,  $\times 6.6$ .

Figs. 11-19. *D. Fendleri*,  $\times 6.6$ ; figs. 11-12, petal and ovary and stamens from a flower from New Mexico; fig. 13, mature capsule from same plant; figs. 14-19, sepals and petal from plant from Baja California, Mexico.

Figs. 20-27. *D. viscosa*,  $\times 13$ ; fig. 20, petal; fig. 27, ovary and stamens; figs. 21-26, sepals (fig. 22, lateral view of a sepal).

Figs. 28-38. *D. sperguloides*,  $\times 13$ ; figs. 28-31, 35-36, sepals; figs. 32-33, petals; fig. 34, ovary and stamens; fig. 37, mature capsule and persistent sepals; fig. 38, arrangement of leaves and branches at a node.

Fig. 39. *D. arenarioides*, petal,  $\times 6.6$ .

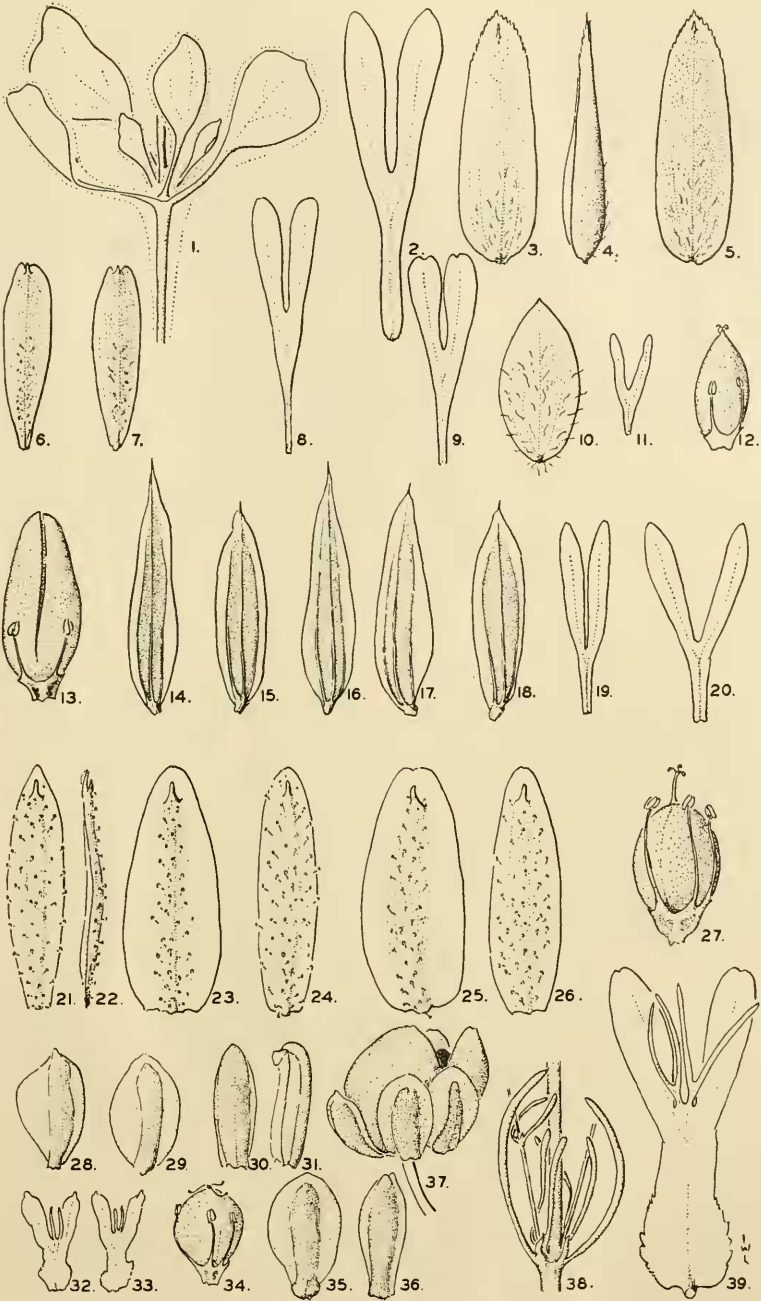


PLATE 22

Figs. 1-8. *D. arenarioides*,  $\times 6.6$ ; figs. 1-5, sepals; fig. 6, ovary and stamens; figs. 7-8, petals.

Figs. 9-16. *D. peninsularis*,  $\times 6.6$ ; figs. 9-13, sepals; figs. 14-16, petals.

Figs. 17-21, 36. *D. Johnstonii*,  $\times 13$ ; fig. 17, flower at anthesis; figs. 18-19, sepals; fig. 20, ovary and stamens; figs. 21, 36, petals and adjacent stamens.

Figs. 22-27, 34. *D. tenella*,  $\times 6.6$ ; figs. 22-26, sepals; fig. 27, ovary and stamens; fig. 34, petal.

Figs. 28-33, 37-38. *D. tenella* var. *nodosa*,  $\times 6.6$ ; figs. 28-30, 37-38, sepals; fig. 31, ovary and stamens; figs. 32-33, petals.

Figs. 39-43. *D. depressa*,  $\times 13$ ; fig. 39, petal; figs. 40-43, sepals.

